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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/831,346	05/11/2001	Siew Kok Hui	P19913	6953
7055	7590	03/18/2005	EXAMINER	
GREENBLUM & BERNSTEIN, P.L.C.			LUGO, DAVID B	
1950 ROLAND CLARKE PLACE				
RESTON, VA 20191			ART UNIT	PAPER NUMBER
			2637	

DATE MAILED: 03/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/831,346	HUI, SIEW KOK <i>OK</i>	
	<b>Examiner</b>	<b>Art Unit</b>	
	David B. Lugo	2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) Responsive to communication(s) filed on 09 November 2004.  
 2a) This action is **FINAL**.                            2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) Claim(s) 1-46 is/are pending in the application.  
 4a) Of the above claim(s) 43 and 44 is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1,2,10,11,13,17,45 and 46 is/are rejected.  
 7) Claim(s) 3-9,12,14-16 and 18-42 is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 11 May 2001 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date See attached sheet.

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) Notice of Informal Patent Application (PTO-152)  
 6) Other: \_\_\_\_\_.



## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of Group I, comprising claims 1-42, 45 and 46 in the reply filed on 11/9/04 is acknowledged. The traversal is on the ground(s) that all the claims are directed to filtering received signals, and although the claims recite different steps, this is an inadequate basis for requiring restriction as they are closely related. Further, applicant argues that the examiner has omitted the "burden" criterion required for a proper restriction as set forth in MPEP § 803. This is not found persuasive because this application is a national stage entry of PCT/SG99/00119, and according to 35 U.S.C. 372, this application is subject to PCT Rule 13 regarding Unity of Invention as indicated in the previous Office action, not under U.S. restriction practice (see also 37 CFR 1.475). Accordingly, the requirement of Unity of Invention pursuant to PCT Rule 13.2 has not been fulfilled for the reasons set forth in the previous Office action, as the indicated groups lack the same or corresponding special technical features. Further, it is noted that there is no burden standard in PCT Rule 13 regarding Unity of Invention, rendering applicants arguments with respect to the burden requirement moot.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 43 and 44 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected group, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 11/9/04.

### ***Claim Objections***

3. Claims 4, 8, 9, 13, 17-42 and 46 are objected to because of the following informalities:

- a. Claim 4, line 3, "noise nergy" should be --noise energy--.

- b. In claims 8 and 9, the term “E<sub>n</sub>” is not defined, and should be indicated as the noise energy in both claims 8 and 9.
- c. Claim 9, line 1, “signal threshold T<sub>n2</sub>” should be --noise threshold T<sub>n2</sub>--.
- d. Claim 13, line 3, it is unclear which signal is being referred to by “the signal” as multiple received signals are recited in base claim 1.
- e. Claim 17, line 3, “a said target signal” should be --said target signal--.
- f. Claim 18 recites the limitation “the difference signal channels” in lines 3-4. There is insufficient antecedent basis for this limitation in the claim.

- g. Claim 20, line 2, “a said target signal” should be --said target signal--.
- h. Claim 21, line 2, “a said target signal” should be --said target signal--.
- i. Claim 22, line 3, “a said target signal” should be --said target signal--.
- j. Claim 23 recites that “the first adaptive filter has a plurality of channels receiving input signals from the first adaptive filter”. The claim should be clarified, since it is unclear how the first adaptive filter can include a plurality of channels that receive input signals from itself (from the adaptive filter).
- k. Claim 23 recites the limitation “the difference signal channels” in line 4. There is insufficient antecedent basis for this limitation in the claim.
- l. In claim 26, it is suggested that the claim positively recite that there are at least two difference signals, since claim 25 only introduces at least one difference signal.
- m. Claim 27, line 2, “the single signals” should be --the single signal--.
- n. Claim 28, it is suggested that the comma in line 3 prior to “processing” be moved to line 2 after “frequency domain signals”.

- o. Claim 32, lines 1-2, the phrase “where “Conj” denotes the complex conjugate”, should be moved to the end of the claim.
- p. In claims 32-34, a period should be inserted at the end of each claim.
- q. Claim 35, lines 2-3, “to form corresponding signal” should be --to form a corresponding signal--.
- r. Claim 40, lines 3-4, it is unclear what is being referred to by “as the signal continues” or “as the signal ceases”, since a signal that “continues” or “ceases” is not clearly defined.
- s. Claim 46 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. The claim recites a method for performing the method of claim 1, while not adding any method steps.

It is noted that the claim, as originally filed, was an apparatus claim. However, if the claim is amended to recite an apparatus, without having any structure or elements, it will be subject to a rejection under 112, 2<sup>nd</sup> paragraph as being indefinite.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

- 4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

- 5. Claims 1, 2, 17, 45 and 46 are rejected under 35 U.S.C. 102(b) as being anticipated by Castello Da Costa et al. U.S. Patent 5,740,256 and Janse U.S. Patent 5,610,991.

As stated in column 9 lines 10-29 of the Castello Da Costa et al. Patent, the Janse Patent is incorporated by reference, and the two Patents will be used in conjunction in this action.

6. Regarding claims 1 and 46, Castello Da Costa et al. disclose an adaptive noise cancelling arrangement for receiving signals from an array of sensors 21, 22, where the received signals are sampled in A/D converters 18, 19, 41, 51 and subsequently processed as shown in Fig. 3, where a first adaptive filter 13 is considered to be arranged to enhance a target signal  $z_0$  of the digitally converted signals, a second adaptive filter 5, arranged to suppress an unwanted signal, and processing the filtered signals to suppress the unwanted signal further in Zelinski-spectral subtraction noise reduction arrangement 70 (see col. 8, line 54 to col. 9, line 21, Fig. 6), where the Zelinski-spectral subtraction noise reduction arrangement 70 is described in the Janse reference, column 4, line 1 to column 5, line 19, as processing the signals in the frequency domain after a Fourier transform is performed.

7. Regarding claim 2, Janse further discloses the determination of a signal energy (combined cross power spectrum) from the signals, and an estimate of the noise from the signal energy (col. 5, lines 1-3, 20-46).

8. Regarding claim 17, the first signal is considered to perform adaptive filtering when the target signal is deemed to be present.

9. Regarding claim 45, Castello Da Costa et al. disclose an adaptive noise cancelling arrangement for receiving signals having wanted and unwanted components where the received signals are processed in the time domain using at least one adaptive filter 220 as shown in Fig. 5, which is included in adaptive filter 5 (col. 6, lines 48-55), arranged to suppress an unwanted signal, and performing an unwanted signal reduction process in the frequency domain in

Zelinski-spectral subtraction noise reduction arrangement 70 (see col. 8, line 54 to col. 9, line 21, Fig. 6), where the Zelinski-spectral subtraction noise reduction arrangement 70 is described in the Janse reference, column 4, line 1 to column 5, line 19, as processing the signals in the frequency domain after a Fourier transform is performed.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Castello Da Costa et al. and Janse in view of Ngo et al. U.S. Patent 5,694,474 (submitted by applicant).

12. Regarding claim 10, Da Costa et al. and Janse disclose an adaptive noise cancelling arrangement as disclosed above, but do not disclose determining the detection of arrival of the target signal.

13. Ngo et al. disclose the use of a direction of arrival (DOA) estimator 20 in Fig. 1 in a microphone array signal processor.

14. It would have been obvious to one of ordinary skill in the art to use a direction of arrival estimator as taught by Ngo et al. in the system of Da Costa et al. and Janse in order to accurately identify and track received target signals.

15. Regarding claim 11, Ngo et al. state that the direction of arrival estimation is employed in an adaptive filter signal processor (col. 20, lines 47-49).

16. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Castello Da Costa et al. and Janse in view of Zurek et al. U.S. Patent 4,956,867 (submitted by applicant).

17. Regarding claim 13, Da Costa et al. and Janse disclose an adaptive noise cancelling arrangement as disclosed above, but do not disclose calculating a measure of the cross-correlation of signals from spaced sensors of the array and treating the signal as an unwanted signal if the degree of cross correlation is less than a selected value.

18. Zurek et al. disclose an adaptation controller 22 that performs a cross-correlation of signals received from spaced sensors of a sensor array (Fig. 1), where the signal is treated as an unwanted signal when the cross-correlation value is below a preselected threshold (col. 4, lines 53-60).

19. It would have been obvious to one of ordinary skill in the art to calculate a cross-correlation value as disclosed by Zurek et al. in the system of Da Costa et al. and Janse to control adaptation of the adaptive filters (col. 5, lines 31-42).

***Allowable Subject Matter***

20. Claims 3-9, 12, 14-16 and 18-42 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and amended to overcome the objections set forth in this Office action.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David B. Lugo whose telephone number is 571-272-3043. The examiner can normally be reached on M-F; 9:30-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Lugo  
3/8/05

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PRIMARY EXAMINER